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ABSTRACT

This evaluation of the Ohio SchoolNet Telecommunity program focused on key Telecommunity objectives of technology deployment, teacher professional development, and student impact. Evaluation methods included use of the Scales of Concern Questionnaire in the application of the Concerns-Based Adoption Model, as well as visits to each of the 23 funded project consortia, during which observation, interviews, focus groups, and document analysis took place. The major sections of this evaluation report address: interactive video technology adoption; perspectives of partners and content providers to schools; impact statements; the need for resources and availability; thoughts about value-added contributions of the technology from the field; and examples of Telecommunity activities. The following four key findings and related recommendations are presented in the executive summary: (1) Telecommunities appear to be moving through similar stages of technology adoption; (2) providers of content expertise and other resources are unsure how they can best participate with their school partners in deploying interactive learning technologies; (3) there are a number of significant learning impact indicators that go beyond what standardized measures will achieve; and (4) increasing pressure has been placed on the Telecommunity program to demonstrate cost-effectiveness. A copy of the questionnaire is appended. (MES)

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THE OHIO SCHOOLNET TELECOMMUNITY EVALUATION

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Year Three Evaluation Results: Examining Interactive Video Adoption and Resource Needs

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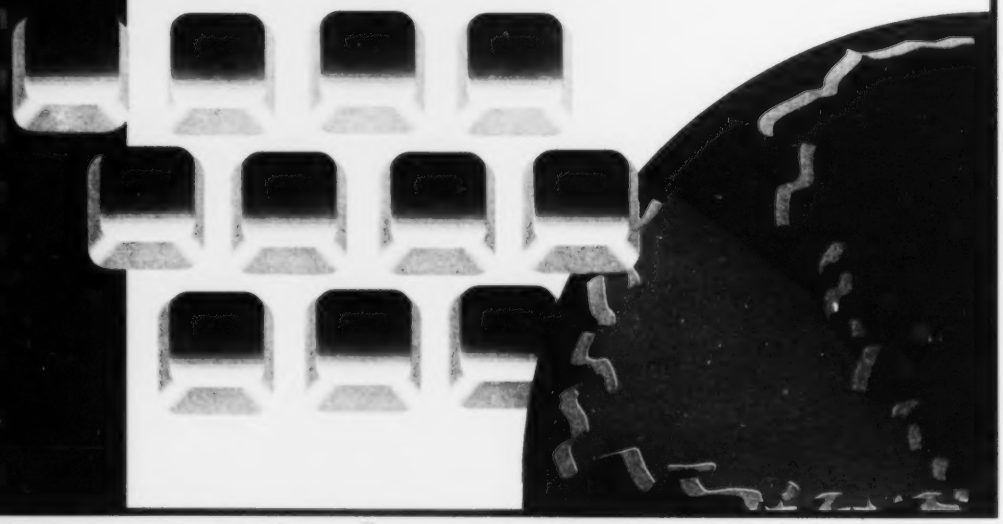

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THE OHIO SCHOOLNET TELECOMMUNITY EVALUATION

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Executive Summary

The SchoolNet Telecommunity enterprise is one of the most extensive programs in the country attempting to employ interactive video technologies to improve the student learning experience. A Public Utilities Commission agreement between the Ohio Department of Education and Ameritech initiated the Telecommunity plan in 1995. In 1996, several other telephone companies serving the state of Ohio joined the SchoolNet Telecommunity program, bringing the total contributions over the six-year life of the enterprise to $26 million dollars.

As partners in bringing interactive video technology to Ohio schools, the telephone companies and leaders of the state Office of Information, Learning, and Technology Services considered the issues that would confront the broad scale use of interactive video in funded sites. These issues included:

- The acquisition and installation of the interactive technology
- The adoption of the interactive technology into the core system of school operation
- The availability of technology for instruction and learning
- The frequency and nature of professional development
- The integration of technology and curriculum
- The impact of the technology on the learning experience of students and teachers

The Evaluation

The partnership sought to address the issues raised in this project by retaining the evaluation services of the North Central Regional Educational Laboratory (NCREL). Through the three years of evaluation, NCREL has focused on providing information that would improve the development of the project. Additionally, each year's evaluation has attempted to build on the results of the previous one.

In this, the third year of the evaluation, several methods were used to arrive at the results presented here. The *Scales of Concern Questionnaire* was used in the application of the Concerns-Based Adoption Model (CBAM). Statistical analysis followed. Each of 23 funded project consortia was visited by members of the evaluation team. During the visits, observation, interviews, focus groups, and document analysis took place. The methods employed contributed to the sections in this report on interactive distance technology implementation and adoption, impact, value, resource deployment, and content provider partnering.

Findings and Recommendations

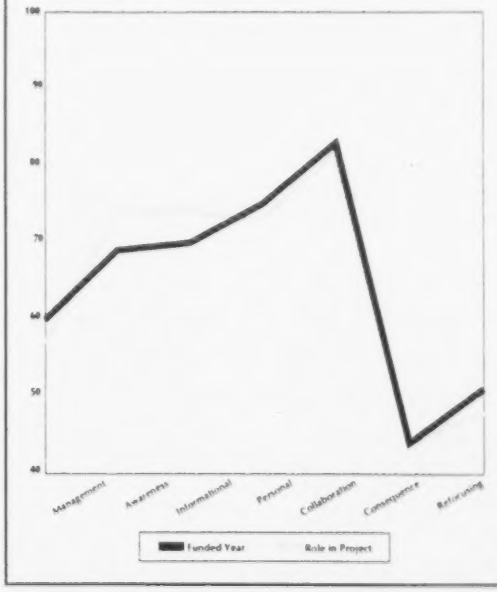
The data collection and analysis resulted in four key findings that are briefly discussed below.

1. **Telecommunities appear to be moving through similar stages of technology adoption. But traditional adoption models may not explain the unique context surrounding the implementation of the Telecommunity project.**

CBAM suggests that the process of change involves moving through a series of concerns about an innovation. The model identifies seven stages of concern: Awareness, Informational, Personal, Management, Consequence, Collaboration, and Refocusing. The profile of Telecommunities, as represented on the model, indicates that, despite year of funding, they have similarly high concerns in the beginning stages of interactive technology adoption, lower concerns through the Management and Consequence stages, and then extensive interest or concerns at the Collaboration Stage.

Events of the adoption of interactive video in Ohio schools suggests a different pattern, like that produced in the Figure 3 below. Participants' concerns about interactive video intensify through the Awareness, Informational, and Personal stages and become most concentrated at the Collaboration stage. The reason for this departure from the model appears to be the sudden influx of money and the edict that accompanied the grants to get the interactive video technology into the schools. They appear to have put the Telecommunities immediately into a Management mode. Acquiring and installing the technology was so problematic for most partnerships that they have only in the last year focused on other technology concerns. With the management concerns generally addressed, Telecommunities are now attempting to meet capacity-building concerns (Awareness, Informational, Personal) through collaboration, which explains the high concerns at CBAM's Collaboration stage.

FIGURE 3
REVISED MODEL OF INTERACTIVE VIDEO TECHNOLOGY ADOPTION



Recommendation: The data implies an extraordinary interest and demand for collaborative opportunities and resources. Because of this, the Telecommunity leadership should step up its efforts to link partnerships on multiple educational levels. In addition, they should make information more accessible (both electronically and on paper) about how each Telecommunity is addressing curriculum integration, teacher training, and student assessment challenges, so that like-minded teachers in Telecommunities across the state can link and learn with each other in true Telecommunity form.

2. **Providers of content expertise and other resources are unsure how they can best participate with their school partners in deploying interactive learning technologies.**

As Telecommunities become operational, they begin to seek resources to which they can link. Currently they are using programs offered by the state's museums and zoos; however, if the Telecommunities continue to use just these few sources, the demand will overwhelm the museums/zoos and force them to dramatically curtail their interactions with the schools. Providers have worked diligently to create and improve interactive programming often attempting to tie their work to Ohio proficiency standards with accompanying pre- and postprogram materials and curriculum guides. Some Telecommunities may consider these instructional materials just right for their programs; other may feel they are too "canned." Clearly, some protocol is necessary to build collaborative ventures and create mutually beneficial expectations between content providers and schools.

Recommendation: A few examples can be found around the state of how providers might collaborate with schools in ways that robustly use the interactive technology while meeting the distinctive needs of the school. This evaluation suggests that the SchoolNet Telecommunity directors use those institutions and experienced school personnel to outline the steps to the curriculum codevelopment and support process for other provider organizations in the state. The product that arises from this work could be a demonstration, a conference, a paper/Web resource, or a combination of the three.

3. **Work with Telecommunities indicate that there are a number of significant learning impact indicators that go beyond what standardized measures will achieve.**

There is an underlying energy and optimism in the measures of impact suggested by those who participate in the implementation of Ohio Telecommunity projects. Such measures include, but are not limited to, the increased attendance of teachers at inservice activities related to telecommunications use, increased student interest in and joy for learning,

increased student understanding of the basic functions of communications technology, and improved student behavior. Those teachers and administrators who have described the project's impact as they are witnessing it in their own settings have done so with seriousness, sincerity, and enthusiasm. Over time and with increased frequency, the descriptors of impact that emerged in this evaluation (see body of report for ten key impact statements) can have a cumulatively significant effect on schooling in Ohio.

Recommendation: We suggest that the impact statements presented in this report be published and promoted as guidelines for the estimation of impact in the Telecommunities. Although no one project should be expected to show improvement on all measures, each would be expected to exhibit growth in four or five areas during evaluations in the coming years. As projects mature, more observations of impact may be added to the list assembled in the report and contribute to a grounded database of determinants of success in Ohio Telecommunities.

4. **Increasing pressure has been placed on the Telecommunity program to demonstrate cost-effectiveness. Participants in the program, however, indicate there are a number of ways to assess the benefit of the technology, many of which may not be accounted for in the traditional sense of cost-effectiveness analysis. It is important to acknowledge these alternatives.**

Cost-effectiveness means different things to different people under different circumstances. In this case, we analyze cost-effectiveness and benefit under the lens of value-added contributions of the technology to the teaching and learning process. Telecommunities prefer to be judged on a relatively diverse continuum of value and effectiveness that asks first what the value-added contribution of the technology is to teaching and learning. Some of the value-added benefits that evaluators and participants in the program have observed include opportunities to explore and to become pioneers; increase in the number and kinds of activities offered and in the number of students and teachers participating; and promotion of understanding, collaboration, and tolerance among students of diverse backgrounds.

Recommendation: We suggest that the measures of cost-effectiveness suggested by Ohio Telecommunity participants and presented in this report be considered as a set of 12 criteria by which Telecommunities could be assessed in the future (see body of report for measures). While no one Telecommunity should be expected to provide positive evidence on all of these measures, perhaps it is reasonable to expect each should show activity on at least four or more if they are making acceptable progress. At the very least, they might provide a set of guidelines to which Telecommunities could direct their efforts.

Summary

Taken together, the data presented in this report show that the essential conditions for improvement-oriented technological application are emerging in the SchoolNet Telecommunity initiative. Some of these conditions include the following:

1. The technology is enabling the education system to function more effectively by putting teachers in greater contact with each other to discuss issues related to curriculum development, delivery, and assessment.

2. Organizational changes, such as block scheduling and the coordination of teacher preparation periods, encourage more effective use of the technology and curriculum.

3. Teachers have access to professional development experiences that have previously been impossible to provide without costly outlay.

4. Students have had access to expert resources of knowledge and information that without the technology would be nonexistent.

5. With video technology in place, more than schools are considering the nature and content of the school learning experience: Museums, universities, businesses, and others have assumed new roles in the education of Telecommunity consortia's students and teachers.

6. The connectivity supplied by the interactive video enables schools to raise awareness and expectations about what others are doing in terms of improving teaching and learning standards.

With one boundary of the technology system encompassing the schools and the other boundary of the system encompassing society (e.g., business, industry, Peace Officer Training Commission, public and commercial broadcasting systems) the sustainability of the Telecommunity initiative improves, as does its affordability. The need these Telecommunities have is to understand how they can better communicate and collaborate with each other to ensure that sustainability.

Introduction

The extensive groundwork being laid for the use of educational technologies in Ohio schools is led by the Ohio SchoolNet initiative. The Telecommunity arm of SchoolNet seeks to work with willing school partnerships to install and use live interactive video technologies to improve the students' learning experience. To date, over 400 public, state-chartered private, and parochial schools have participated in Telecommunity grants. The grants are provided by nine participating Ohio telephone companies through a 1995 agreement with the Ohio Department of Education and the Public Utilities Commission of Ohio. Schools partnerships have use the grants to purchase network-video equipment, fund line fees, and support content and teacher development.

Evaluation

This evaluation is part of the Telecommunity's program of self-examination and assessment, and is supported by Ameritech Ohio. The purpose of the evaluation is to identify ways to improve the design and implementation of the Telecommunity program as administered by the Ohio Department of Education Office of Information, Learning and Technology Services. The report attempts to build on the previous two annual reports by focusing on key Telecommunity objectives: technology deployment, teacher professional development, and student impact.

A variety of methods have been used to answer key evaluation questions. The *Scales of Concern Questionnaire* was used in the application of the Concerns-Based Adoption Model (CBAM). Statistical analysis followed. Each of 23 funded project consortia was visited by members of the evaluation team. During the visits, observations, interviews, focus groups, and document analysis took place. The methods employed contributed to the sections in this report on interactive distance technology implementation and adoption, impact, value, resource deployment, and content provider partnering.

Project Implementation Status

This evaluation begins with a "snapshot" of the status of project implementation. Last year's evaluation report characterized projects along a continuum of platforms of technology use: traditional distance education, full-motion portable units, and desktop video. This year, the projects we visited seem to be using the technology for one of two broadly defined purposes: as traditional distance education to extend a classroom-based course from one location to another, and as an enrichment resource (see Table 1). While we are making a primary distinction between these two purposes, we do not mean to suggest that both aren't evident in most projects.

Table 1 Operating Status of Projects		
	Traditional Distance Education	Enrichment Resource
Operating (Using the technology to deliver learning activities to students)	Columbiana County Indian Valley NOTA New Lexington Toledo Telecommunity	Vital Links Imaginet International Space Station New Millenium Kids Allen County Telecommunity Appalachin Project
Almost Fully Operational	LEARN Project Access	Catholic Conference[a] Upper Arlington Great Seal Network
Some Equipment Purchased, Minimum Operation	Learning Community Link[b]	Summit[c] Prodigy Project HEAL
Equipment Not Purchased	Auglaize-Mercer East WOCO South Central Ohio[d]	

[a]*Students are corresponding by e-mail, but not interacting by television.*
[b]*Two elementary schools in Lawrence County are linked.*
[c]*One site had equipment when visited and planned to be operational by mid-January 1999.*
[d]Classes are being offered with equipment from another project. When visited in mid-November 1998, equipment had not been purchased

Generally, network video use seems to look like traditional distance education—traditional perhaps because it is the most common model for educators in these projects to work from, and/or because it presents the most efficient use of the technology at this time. However, both traditional or enrichment applications allow for creative curriculum integration.

Interactive Video Technology Adoption Analysis

Maney and Brooks (1996)[1] offer a blueprint for technology adoption in K-12 schools to guide technology development in SchoolNet consortia. The authors base their recommendations on their experience in one of SchoolNet's 14 original prototype and early adopter SchoolNet Plus projects. The blueprint offers a number of good and referenced insights into the adoption of a new technology. Their analysis

[1] *Maney, J. K. & Brooks, D. M. (1996). A blueprint for technology adoption in K-12 schools. Ohio ASCD Journal 4(2). Pp. 20-25.*

contends that teachers progress through common stages of technology adoption.

Hall, George, and Rutherford (1979),[2] in their Concern-Based Adoption Model, developed the notion that the adoption of any educational innovation moves through seven stages:

Awareness Little concern or involvement is shown with the technology.

Informational A general awareness of the technology and interest in learning more detail about it is indicated.

Personal The person is uncertain about the demands of the technology innovation, his or her inadequacy to meet those demands, and his or her role in the innovation.

Management Attention is focused on the processes and tasks of using the technology and the best use of the information and resources. Issues related to efficiency, organizing, managing, scheduling, and time demands are utmost.

Consequence Attention focuses on the impact of the technology on students. The focus is on the relevance of the innovation for students and evaluation of student outcomes, including performance and competencies.

Collaboration The focus is on coordination and cooperation with others regarding the use of the technology.

Refocusing The focus is on exploration of more universal benefits from the technology.

The concerns-based theory of innovation adoption developed into a time-tested and well-constructed tool for assessing the implementation of program innovations. We have applied this tool to answer the following questions about SchoolNet Telecommunity Interactive Video technology adoption:

1. Are Telecommunity sites adopting interactive video and does their adoption process approximate standard adoption models?
2. How quickly do Telecommunities appear to be moving through the adoption process?
3. What types of technology adoption and implementation concerns do key participants have?

[2] *Hall, G. E., George, A., & Rutherford, W. L. (1979). Measuring stages of concern about the innovation: A manual for use of the SoC questionnaire. Austin, TX: Southwest Regional Educational Laboratory.*

4. How do various factors of implementation appear to impact technology adoption?

5. What information or resource needs are necessary to further encourage the adoption of the technology?

The 35-item instrument (see Appendix A) was administered to 133 participants in 22 implementation grants around the state. The instrument was accessible on a North Central Regional Educational Laboratory (NCREL)-supported Web site and also manually administered at sites with less than robust Internet accessibility. When data collection was completed, responses were tabulated and statistically analyzed. The following section briefly summarizes the CBAM data.

IDV Technology Adoption

The first analysis performed with CBAM examines the intercorrelation between the seven stages of adoption. In the correlation table below a series of Pearson correlation coefficients are tabulated. The table shows that early stages of adoption (Awareness, Informational, Personal, and Management) are more generally correlated with each other than they are with later stages of adoption (Consequence, Collaboration, and Refocusing). These intercorrelations roughly suggest that Telecommunities are generally adopting and integrating their technology in ways this model suggests most innovations are adopted.

TABLE 2
INTERCORRELATIONS AMONG STAGES OF CONCERN

	Awareness	Informational	Personal	Management	Consequence	Collaboration	Refocusing
Awareness	1.00	.371**	.250**	.308**	.268**	-.250**	.127
Informational		1.00	.567**	.321**	.162	.124	.116
Personal			1.00	.538**	.287**	.209*	.180*
Management				1.00	.093	.050	.144
Consequence					1.000	.225**	.468**
Collaboration						1.000	.291**
Refocusing							1.00

** Correlation is significant at the 0.05 level (1-tailed)*
*** Correlation is significant at the 0.01 level (2-tailed)*

Analysis by Year in Project. The Ohio SchoolNet Telecommunity initiative has funded implementation projects in each of the last three calendar years (1996, 1997, 1998). Logic would indicate that projects funded in 1996 would be at later stages of concern than projects funded in 1997, and that projects funded in both 1996 and 1997 would also be at later stages than projects funded in 1998. That reasoning holds true in a broad sense of analysis with small increments of separation between the three years at most stages. The intensity of concern at each of the seven stages, however, indicates other forces on interactive video technology may be at work.

To determine how participants move along the stages of adoption by year and how intense participants' concerns are at each stage, the percentile scores in all seven stages were averaged. Applying a conversion algorithm to the score at each stage produced the snapshot profile of interactive video adoption illustrated in Figure 1 on following page.

The profile shows that concerns are heaviest in the early stages of technology adoption (Awareness, Informational, and Personal). Concerns about Management of the technology and the Consequence of technology use are low while concerns at the Collaboration stage are highest in the model.

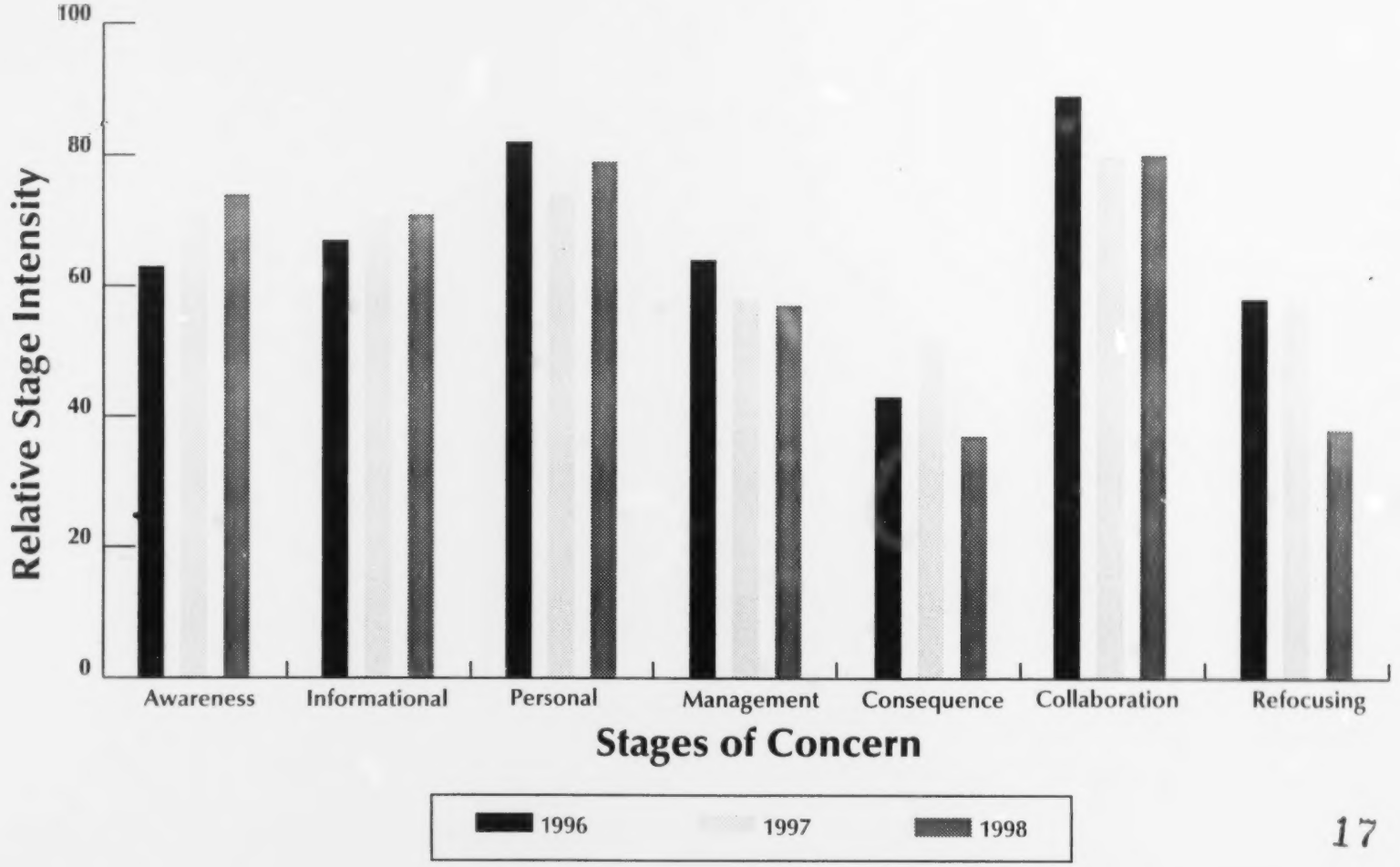
At the Consequence stage, differences between the 1997 and 1998 funded years are significant ($F = 4.2$, $df = 2$, $.p = .017$). Scores at the Collaboration stage provide perhaps the most important data in this table. All three groups by funded year show a high concern at this stage. At the Refocusing stage, the 1998 group falls significantly ($F = 4.48$, $df = 2$, $.p = .013$) lower on the scale of concern than do the 1996 and 1997 groups.

Analysis by Role in Project. Because participants sometimes assume vastly different roles in the implementation of a new and sophisticated technology, their concerns for adoption might vary. This analysis sampled the perspectives of five categories of participants:

- Project administrator
- Site administrator (building principal/assistant principal)
- Technology coordinator
- Teacher currently involved in the project
- Prospective teacher in the project

The profiles of these categories of participants are illustrated in Figure 2. Not surprisingly, the profile of concerns by participants' role in the Telecommunity is similar to the snapshot profile given of years in the Telecommunity. Concerns in early stages are

FIGURE 1
PROFILE OF TECHNOLOGY ADOPTION BY FUNDED YEAR



high while concerns in later stages of adoption are lower, with high concern at the Collaboration stage. The interest in collaboration remains consistent. Questions about how to apply the technology remain constant among all groups. What is interesting here is the position of each group at the seven stages.

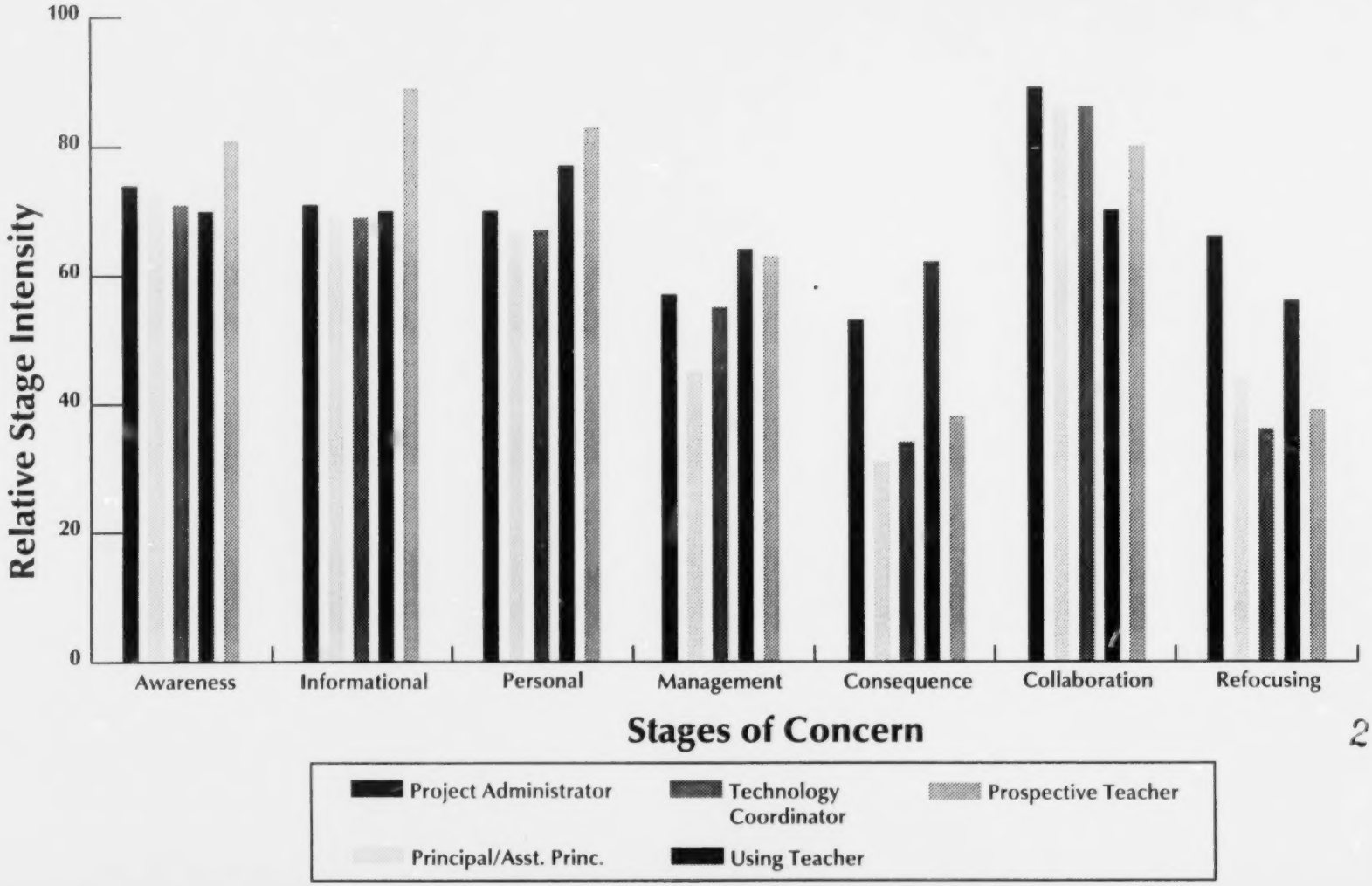
Prospective teachers are highest in the early stages and lowest in the advanced stages of adoption, which would be characteristic of the most recent participants. Teachers using network video have the highest concerns at the Management and Consequence stages, suggesting a keen interest in how the technology is applied in the classroom and the impact it has on students. Teachers' levels of concern at these two stages illustrate that with some experience in implementing interactive video, the movement along the adoption continuum accelerates. Project administrators are highest at the Collaboration and Refocusing stages, which fits their roles as coordinators of the project looking for new opportunities to reach new partners and customize the use of the technology to meet the unique needs of the students and teachers.

The analysis of variance (see Table 3) between the stages illustrates that participants have unique roles in the application of interactive video technology and that their information needs for effectively performing those roles are also unique and significantly different at the later stages of concern.

TABLE 3
ANOVA OF TECHNOLOGY ADOPTION STAGE BY ROLE IN PROJECT

Stage	Sum of Squares	Df	Mean Square	F	Sig.
Awareness	2515.7	5	503.1	.92	.47
Informational	2599.1	5	519.8	.99	.42
Personal	4525.9	5	905.2	1.78	.12
Management	4657.4	5	931.4	1.25	.29
Consequence	10385.5	5	2077.1	3.29	.008
Collaboration	5541.7	5	1108.3	2.57	.03
Refocusing	9495.9	5	1899.1	2.57	.03

FIGURE 2
PROFILE OF TECHNOLOGY ADOPTION BY ROLE IN PROJECT



Other factors appearing to influence the use of interactive video in Telecommunity sites include the participant's year in the project and comfort level with educational technologies (desktop computers and their applications) as a whole (see Table 4). Table 4 also shows that the more time an individual spends in the project, the stronger the correlation with later stages of innovation adoption concern.

TABLE 4
CORRELATION BETWEEN STAGE OF CONCERN, YEAR IN PROJECT, AND COMFORT WITH EDUCATIONAL TECHNOLOGIES AS A WHOLE

	Year in project	Comfort level with ed. tech.
Awareness	-.193*	-.292
Informational	-.079	-.278**
Personal	-.003	-.142
Management	-.067	.027
Consequence	.058	.290**
Collaboration	.192*	.196*
Refocusing	.274**	.239**

* Correlation is significant at the 0.02 level (1-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Analysis of Subcomponents Related to High Implementation of Interactive Video Adoption

With a measure of technology adoption at each stage of the model for each consortia, it is possible to analyze various subcomponents of high-technology adoption for their ability to move projects along the technology adoption path. Evaluators collected data from each of the 22 implementation sites participating in this study. Pearson Correlation Coefficients were computed for each subcomponent at each stage. The higher the correlation coefficient (negative or positive), the more important the subcomponent as an indicator of technology adoption and implementation. The lower the coefficient, the less likely the subcomponent is a predictor of high adoption. Table 5 presents the correlation coefficients between the stages of technology adoption and implementation subcomponents.

TABLE 5
CORRELATION OF SUBCOMPONENTS TO INTERACTIVE VIDEO ADOPTION

Sub-Component:	Technical assistance from Telecommunity faculty or staff	Leadership locus within the school			Diversity of types[1] of partners affiliated with the project	Number of partners	Presence and duration of guiding theme or curriculum model	Audience served (urban, rural, suburban)			Critical mass of participating teachers at start of project	Scheduling of of professional development options	Technology is available for training
Stage:		School	District	External				Urban	Rural	Suburban			
Awareness	-.120	-.093	-.155	.215*	-.184*	.016	-.047	.080	-.004	.051	-.196*	.028	-.096
Informational	-.171*	.009	-.355**	.311*	-.344**	-.154	.022	-.084	-.059	-.127	-.355**	-.106	-.261**
Personal	-.94	.120	-.210*	.092	-.180*	-.034	.065	-.069	-.055	-.075	-.203*	-.227**	-.217*
Management	.052	.099	-.298**	.187*	-.096	-.049	.080	-.081	-.084	-.074	-.343**	-.196*	-.251**
Consequence	-.036	.188*	.022	-.171*	-.008	-.051	.020	.154	-.049	.090	.047	.077	.034
Collaboration	-.041	.016	.051	-. 058	-.032	.131	.071	-.165	.066	-.024	.170	-.057	.033
Refocusing	.061	.159	.057	-.179*	.056	-.083	.121	.139	.034	.029	.083	.111	.198*

** Correlation is significant at the 0.05 level (1-tailed)*

*** Correlation is significant at the 0.01 level (2-tailed)*

[1] *1) other schools/districts, 2) museums/zoos/historical centers, 3) higher education, 4) RPDCs/SCs, 5) libraries, 6) corporation/business, 7) state/government agencies or not-for-profits*

Briefly, influential subcomponents in the adoption of interactive video in participating consortia include the nature of the technical assistance, the locus of project leadership, the diversity of partners, the volume of teachers participating in core training, and the options and availability of technology for professional development. Where technical assistance is concerned, the table shows negative correlations at almost every stage of adoption. The data on leadership locus show that when the leadership is from outside of the district or school implementing the technology (higher education, A-site, SEA), participants are less likely to have moved into upper stages of technology adoption. On diversity of partners, the more types of partners in the implementation of interactive video, the less likely the concerns have moved beyond the early stages of technology adoption. In other words more types of partners does not mean better implementation. Predictably, where professional development is flexible, offered in a variety of formats, and applies the technology for hands-on use, the more likely that participants' concerns will have moved past the early stages of adoption toward advanced stages of technology adoption. Subcomponents of implementation with no relationship to the technology adoption stages include the audience served, the number of partners in the consortia, or the presence of the guiding theme or working curriculum model. Let it be noted, however, that this data indicates no direct relationship between curricular theme and implementation. However, the experience of the evaluators, based on interviews and observations with project participants, qualitatively suggests that theme does have an effect on the quality of implementation.

More exploration of subcomponents of technology adoption is needed to be definitive about implementation variables' effect on interactive technology adoption. Exploration is a start, but only to be considered with the following caveats in mind: First, all correlations in this table are low and although they suggest some type of relationship between implementation subcomponents and stages of adoption, none of those relationships are strong. Second, the data suggests that the variables are related in some manner. Factorial analysis—not applied in this look at the data—would show how variables are related to each other. Many of the subcomponents of implementation are measured only on three-level categorical data. A finer scale would provide better definition of the relationship. Sources of information from each of the consortia are not entirely comprehensive and may be absent of relevant data. For instance, while this analysis accounts for the diversity and number of partners, it does not distinguish how active these partners are in the development and delivery of instruction using the technology.

Discussion on Telecommunity Implementation and Interactive Technology Adoption

The Concerns-Based Adoption Model seems to be able to explain only in part the use and promotion of interactive video technology in funded consortia. When Telecommunities are analyzed by funded year, the model shows that projects move toward technology adoption in a familiar pattern, earlier-funded projects slightly ahead of later-funded projects. Though the pace of adoption is not rapid, it does appear to be sustained.

According to CBAM, concerns by all subgroups in all three years are relatively high in the early stages of adoption. Concerns about technology Management and Consequence seem to be resolved or at least latent, while the concerns about Collaboration are high. This pattern is amazingly consistent and begs the question, How can projects have concerns that are representative of both beginning and advanced technology adoption? The answer may be that a new pattern of technology adoption is at work here and that a systematic and systemic interest in Collaboration is prompted by technology deployment.

A new pattern of technology adoption. The legislative mandate that guides the development of the Ohio SchoolNet Telecommunity initiative encourages the Ohio Office of Information, Learning, and Technology Services to disseminate available funds as efficiently and quickly as possible. The availability of immediate funds has forced prospective Telecommunities to consider Management concerns first. Management concerns include the coordination of bell schedules between participating schools; the location of the technology in schools; the wiring, storage, and security of components, which are are all logistical, not pedagogical concerns. The Management stage, assigned the middle of the seven stages of CBAM, appears to the be the first in this different model of innovation adoption. Here, while participants work to assuage concerns at the Management stage, Awareness, Informational and Management concerns emerge. This is where many Telecommunities appear to presently be. By forcing Telecommunities to grapple with Management concerns of a very sophisticated learning technology early in the adoption process, the stages of innovation adoption that focus on participant capacity building are bypassed. Because these capacity-building stages are essential, they become the stages of concern that follow Management.

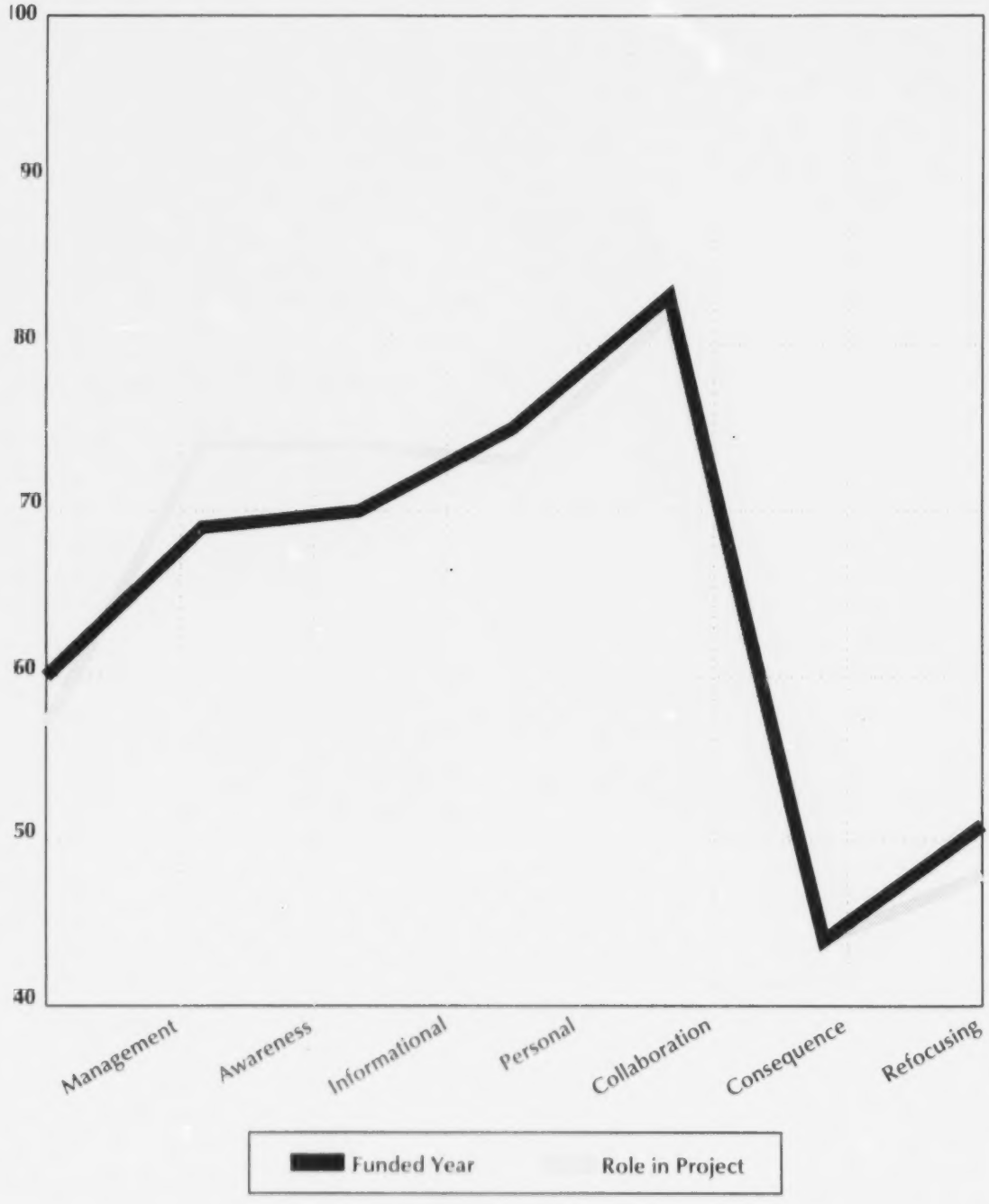
Collaboration is the coping mechanism that project participants use to attain some definition and clarification of how this interactive distance learning technology will be integrated into the learning curriculum and what the integration process requires of

them. Collaboration is the sixth of CBAM's seven stages of concern. The data here, however, make a strong case for Collaboration as a fifth stage, followed then by Consequence and Refocusing. A revised model of technology adoption applying the stages of concern in the order discussed here is illustrated in Figure 3.

With Management concerns largely resolved, concerns at the Informational, Awareness, and Personal stages appear most pressing with concern peaking at the Collaboration stage. Telecommunity teachers, administrators, partners, and project managers appear to view Collaboration as the best way to address their own Awareness, Informational, and Personal concerns. In cultivating the need for collaboration, the Telecommunity project has created in participants a powerful need to know how other schools are using the technology, who can partner with schools, and who's out there to connect with. Participants see the potential the technology has for facilitating collaboration between new and geographically removed partners and are excited to begin those collaborative ventures. Clearly, a complex and technical innovation such as interactive video requires collaboration as a guidance, sustenance, and success mechanism. The implication for this data is that increased levels of professional and resource support are necessary to address Telecommunity consortia collaboration needs.

Whether intentional or unintentional, the model for deploying interactive technologies, although bucking conventional models, may just do the best job of making learning communities out of the schools, businesses, museums, and other entities that compose the partnerships by making collaboration a coping mechanism for meeting Awareness Informational and Personal concerns. It remains to be seen how this model holds up over time.

FIGURE 3
REVISED MODEL OF INTERACTIVE VIDEO TECHNOLOGY ADOPTION



Perspectives of Partners and Content Providers to Schools

Overview

As Telecommunities become operational, they begin to seek resources with which they can link. In interviews with Telecommunity managers and teachers, they repeatedly expressed a desire to draw upon the resources of the state's museums and zoos. Unfortunately, if the existing Telecommunities in Ohio were all to request programming from the same source, that source would become overwhelmed and unable to respond.

To obtain the views of content providers on how they are serving Telecommunities, telephone interviews were conducted with representatives of eight of the resources most often mentioned: the Cincinnati, Cleveland, and Columbus Zoos; the Wilds; the Ohio Historical Society; the Cleveland Museum of Art; COSI Columbus; and COSI Toledo. A summary of the main points raised in these interviews is presented below and is followed by the notes from each of the interviews.

1. **All providers offer or plan to offer interactive programs, but they vary widely in the amount of programming they have available.**

Currently the Cleveland Zoo has the most classes available. Zoo staff develop a list and offer it first to the HEAL Telecommunity, of which it is a partner. Any classes not scheduled are then opened to all other Telecommunities. A flyer is sent to all Telecommunities announcing availability, and reservations are made on a first-come/first-served basis. The Zoo already has schools on a waiting list for fall 1999 classes.

None of the other providers said they have any difficulty responding to requests for their services. Most requests come from informal, word-of-mouth contacts. The Cincinnati Zoo has its program listed on its Web site and a registration form can be downloaded and sent by fax to the zoo. The Columbus Zoo has just received a grant for its own television equipment. Up to this time, it has had to rent equipment from the Department of Administrative Services.

2. **Some of the providers charge for programs; others do not.**

The Cleveland Zoo, the Wilds, and the Historical Society do not currently charge for programs. The Cincinnati Zoo charges $80 for programs that were not developed under a SchoolNet grant. The Columbus Zoo charges $70 and COSI Toledo charges $100. The Cleveland Museum of Art is currently only providing programs to HEAL. When it makes programs available to other

Telecommunities, it will probably charge $50 to $75. COSI Columbus has not set prices, but will do so after it has tested its programs with the Columbus Public Schools.

3. **Providers design their programs to be interactive and tied to Ohio proficiency standards with accompanying pre- and postprogram materials and curriculum guides.**

All of the providers spoke of the need to maximize the potential of interactive television. None of them wants to do "show and tell." The providers would like assistance from the SchoolNet office to ensure the programs they offer are aligned with Ohio proficiency standards. They would also like information about Telecommunities that can receive their programs and the kinds of content that are most needed.

4. **Some providers have had problems linking with the Department of Administrative Services' SOMACS system; others have not.**

The Cincinnati Zoo reported it had problems virtually every time it tried to use SOMACS. The Historical Society said it rarely does. The more frequently sites are linked, the fewer the problems.

Recommendation: Providers of content expertise and other resources are unsure how they can best participate with their school partners in deploying interactive learning technologies. There are a few examples around the state of how providers might collaborate with schools in ways that robustly use the interactive technology while meeting the distinctive needs of the school. This evaluation suggests that the SchoolNet Telecommunity directors use those content providers and experienced school personnel to outline the steps to the curriculum codevelopment and support process for other provider organizations in the state. The product that arises from this work could be a demonstration, a conference, a paper/Web resource, or a combination of the three.

Summaries of Discussions With Providers

Christine Korhnak, educational specialist, Cleveland Metroparks Zoo. Currently the zoo is offering classes to any Telecommunity that has the capacity to receive them. For each semester of the school year, the educational staff at the zoo develops a schedule of classes it will have available. The opportunity to sign up for these classes is offered first to the HEAL project with the understanding that only two schools can schedule a given class hour. Korhnak limits the number of receiving sites to facilitate interaction between the students and the presenters.

After two weeks, any classes that are not filled are made available to all other Telecommunities funded by the SchoolNet office. Scheduling these other schools is on a

first-come/first served basis. Already Korhnak has schools on a waiting list to receive classes during fall 1999.

At present, the zoo does not charge for its programs, but it appears that it may have to do so in the future. Korhnak has been discussing this possibility with other content providers who currently charge for virtual visits. Even though their charges are modest—e.g., $50 for a virtual visit to the Cleveland Museum of Art and $80 for the Cincinnati Zoo—these providers have far less demand for their programs than the Cleveland Zoo. Korhnak thinks this is because the schools that have Telecommunity grants have not budgeted funds for virtual field trips. In addition, many Telecommunity schools are in low-wealth districts.

During the current school year, the HEAL project is paying more than half of the line fees for the zoo, and the zoo is picking up the rest from other distance learning projects, but this proportion is likely to be reversed next year. One option Korhnak is considering is asking Telecommunities to pay a flat fee for unlimited access for their schools. If enough projects were willing to do so, the cost would be relatively low, and they would be more likely to schedule the classes the zoo offers. Her major concerns are that charging fees will cause districts to limit the number of classes they schedule and have large numbers of students take part in those that are scheduled. Both of these developments would reduce the opportunities for students to interact with the presenters and thus minimize the potential of the medium.

Nancy Hampson, educational specialist, Columbus Zoo. The Columbus Zoo is just beginning to provide distance learning opportunities. To date, it has had to borrow equipment from the Ohio Department of Administrative Services and pay to have it set up. The zoo has recently received a grant to purchase its own mobile equipment. The zoo does not have a classroom or studio and does not want either. It wants to be able to take viewers to exhibits or behind the scenes to show how a zoo operates.

The exhibit that has been mainly used for distance learning is the coral reef. This living reef is in a 100,000 gallon tank with many of the organisms that would be found in the ocean. The theme of this presentation is habitats, and the coral reef provides an unusual perspective to this content area.

The educational staff designs its program to be interactive. It does not want to just show animals lying at rest. As part of the coral reef presentation, for example, a diver goes into the exhibit and brings some of its contents to the television camera for close-up views. Later in the presentation the diver comes out of the tank and is available to respond to questions from the viewers.

The educational staff aligns their presentations with the Ohio science and biology proficiencies. The staff provides teachers with pre and postvisit information materials, suggested learning activities, and manipulative materials for mini-experiments.

The zoo charges $70 per program. Each program is aimed primarily at the elementary level. The zoo attempts to have a variety of resources that will respond to different levels of technological capabilities. For teachers who do not have access to interactive video, the zoo can provide videotapes, CD-ROMS, or World Wide Web materials.

The main assistance the SchoolNet office could provide the zoo is to supply information about schools that have the equipment to receive interactive television, including the technical specifications required to link with each site. The educational staff would also appreciate assistance in aligning its programs with Ohio proficiency standards. The zoo needs to know what the schools want if they are to provide useful material.

Diane Silver, distance learning coordinator, Cincinnati Zoo. The zoo has received a grant from the Ohio SchoolNet office to produce curriculum materials in two areas: biological classification and zoo careers. These material are developed to be part of a problem-based learning experience. Prior to making a virtual visit to the zoo, students should have defined a real-world problem that requires information to find the solution. Working on their problem should develop the students' "need to know," which the visit to the zoo helps to answer. The classification material is ready for use; the zoo career material is still being developed.

In addition to its direct grant, the zoo is a partner with four consortia that have received Telecommunity grants. As a partner, it is developing materials that carry out the activities specified in the proposals. The educational staff has also developed some short, stand-alone programs designed to have a wide appeal to schools. The content and length of the programs are modified to make it appropriate to the grade levels that take part. K-3 programs are typically about thirty to forty minutes; Grade 4-8 programs, forty to fifty minutes; and middle/high school programs by the bell schedule.

All of the zoo's televised programs are described on its Web site, www.cincyzoo.org. This site also has a registration form that can be downloaded and faxed to the zoo. Programs are offered as they are requested. Prior to each program, information is faxed to the teacher. These materials include learning activities to prepare the students for the virtual visit. The zoo does not charge Ohio schools for programs that have material developed under the zoo's SchoolNet grant or for those Telecommunities with which the

zoo is a partner. For other programs, or non-Ohio schools, the zoo charges an $80 fee to offset some of its costs.

The zoo bridges all of its televised programs through a server at the University of Cincinnati. When it is linking with sites outside the area served by Cincinnati Bell, it must be patched into the Department of Administrative Services' bridge. Problems occur almost every time these links are made, and Silver must make telephone calls to resolve the problems.

The main assistance Silver would like from the SchoolNet office is the services of someone in the Cincinnati area who could provide technology support on an ongoing basis without a separate fee for each contact. She is a content specialist and is learning the technical side of interactive television on the job. Each of her programs involves varied content and media-live animals, videotapes, slides, and so on. It is very difficult to coordinate all these and still solve the technical transmission problems that almost always occur.

Despite the frustrations, Silver is very positive about interactive television. She feels it has great potential to increase access to the zoo's resources. She wants each program to be a high-quality learning experience, not just a show-and-tell.

Larry Fruth, visitors program director, COSI Toledo. Fruth participated in the focus group conducted with the Toledo Telecommunities Partners on December 14, 1998. The major activities of COSI Toledo and Fruth's views on interactive distance learning are discussed in that site visit report. This is a supplement to that report.

To date, COSI has done little marketing of the programs it has available. Most requests have come from word of mouth. The one major exception is the requests that have come from a link on the Pacific Bell Web page. COSI is listed as a provider on this Web page, which has resulted in many inquiries.

COSI has established a fee of $100 for a forty-five-minute program. This fee covers a kit of materials related to the program, which is sent to the school two weeks before the interactive visit. COSI is using broadband (DS3) transmission rather than T1 because it wants a high-quality picture.

To date there have been no problems in responding to the demand for programs. If the number of requests increases greatly, the only constraint would be having adequate staff to respond. If that becomes a problem, COSI will hire more people.

Fruth thinks the medium has a tremendous potential to bring children from different backgrounds (inner city, rural, suburban) together to get to know one another. He would like to see programs that allow stu-

dents from diverse backgrounds to work on common projects. He hopes that those who use interactive television will "challenge the medium" by experimenting with new and different ways to use it.

Marjorie Williams, education director, Cleveland Museum of Art. The only Telecommunity for which the Cleveland Museum is now providing programming is to its partner, HEAL. The museum is pilot testing its program, which will be made available to all Telecommunities in the spring of 1999. The program the museum is now offering is based on Egypt, and it is geared to elementary students. When it has sufficient content, the museum will market its programming to sites that have the necessary equipment. It will develop a listing of programs and times they will be available and send the information to all of the Telecommunities. Use will be on a first-come/first-served basis. The expected price is in the range of $50 to $75.

The museum is currently sending interactive programs to hospitals in the area. These programs are presented in the pediatric lounges. This project is labor intensive, because the museum sends its own staff to the hospitals to operate the equipment. It is considering broadcasting the same programs, without interactive capability, to the rooms of children who are too ill to come to the lounges.

Sharon Antle, chief, educational services, and Shawn Pickard, former distance education coordinator, Ohio Historical Society. The Historical Society has provided interactive video programs to approximately six Telecommunities. It has been working most closely with the New Lexington project, primarily because the coordinator for that project was the first to request the society's cooperation. The society does not charge for its programs, and it hopes it will be able to continue that policy.

Its most popular program has been "Why is Rush Creek Orange?" This program examines the effect of human settlement on the drainage into Rush Creek. It has provided content around this topic to students from grades 1, 3, 4, 8, 9, and 10. The program includes still pictures, videotape, scripts, and multimedia presentations. The society worked with the Cincinnati Zoo, the Wilds, and state agencies involved in the conservation district in the production of this program.

Other programs it has presented include:

- Dig Ohio, which teaches some of the methods of archeology and the history and cultures of the Adena and Hopewell people
- Jazz Age, a program with live jazz musicians

- Underground Railroad, which includes a virtual visit to Ohio Village and opportunities to talk with "residents" of the village
- Ohio in the Civil War
- Backyard History, which uses cemeteries and architecture to teach the history of an area

Each program includes two and sometimes three sessions. The educational staff structures the programs to have a pre- and postactivity and preferably a project for the students in order to to put the video presentation and interaction into a context. The best programs are those where the students present the results of their projects.

The society has a flyer listing these programs, but most requests come through word of mouth. In developing its programs, the society has attempted to respond to the needs of teachers and align the contents with Ohio proficiency standards while capitalizing on the unique strengths of the society's resources.

The society has established a dedicated distance learning studio in Columbus and has equipped two of its other sites, Campus Martius and Fort Ancient. The society also has a remote camera that is used to take viewers into Ohio Village and to see the mounds at Fort Ancient. The society broadcasts on T1 lines and, unlike some other content providers, has encountered very few problems linking with SOMACS. Pickard said he has linked with New Lexington 25 or 30 times without any problems. He said problems usually occur the first time a site uses SOMACS. Once the specifications for a site are established, few problems arise.

Antle feels the technology is an excellent way to increase outreach to schools, and she is committed to responding to requests from Telecommunities. She recognizes that demand is likely to increase, but for the foreseeable future, the society will follow a first-come/first-served policy and continue to offer its programs without charge to the schools.

Pickard stresses that for interactive television to be used, teachers have to become comfortable with it. They need training and technical support. Interactive video should be a help, not a burden. Teachers also need a central point that lists the resources that are available and how to access them.

Mara Hull, vice president, education, COSI, Columbus. COSI is not currently offering any programs, but it is preparing prototypes that it will be testing with the Columbus Public Schools in the near future. The first of these, titled Bionics and Transplants, should be available for testing in February 1999. Another program, Surgical Suite, will show live surgery from Columbus

hospitals. For this program, students will have to come to COSI. At some time in the future, it may be possible to send the surgery program to schools, but there are many legal barriers to such distribution.

In the fall of 1999, COSI will move to a new building that is currently under construction. When it makes this move, it will develop programs based on exhibits in the new building. Only a few of the current exhibits will be moved, so Hull is postponing development of these programs. COSI currently has both T1 and ISDN lines and a VTel unit that should be compatible with almost any equipment in the schools.

When COSI begins regular programming, it will charge for its services, but it has not established any prices to date. It anticipates offering different packages of 15- and 30-minute programs from which schools can select the combination and price most suitable for them.

Hull hopes to be able to broadcast to several sites at the same time, a process she referred to as "multi-pointing." For such programs she likes to have a mixture of urban, suburban, and rural schools. She has had experience with such programs in a previous position. Hull describes this experience as "not on the leading edge, but on the bleeding edge." When presenting these previous programs, she found she had to delay her planned content to allow the students to get to know one another. She realized how important this was to the students and the opportunity it provided meet with peers from quite different backgrounds.

Hull's main wish for assistance is information about the equipment in the various Telecommunities and the technical specifications for linking with them. She said she has been searching for such information so she can better plan her equipment needs and anticipated costs. Hull also would like guidance on what the schools want and need from COSI.

Sherry Hubbard, director of education, The Wilds. The Wilds has been most closely involved with the New Lexington Telecommunity and has also developed programs in cooperation with the Cleveland Zoo for the HEAL Telecommunity. It has received direct funding from these two sources for the development of content.

The Wilds also presents short exploratory programs upon request. The frequency of these short sessions has varied from as often as five times a week to as few as twice a month. Hubbard has not promoted these programs, but has responded to teacher requests as she has had the time to do so. The Wilds does not charge for these short programs, and Hubbard hopes it will not have to do so for at least two more years. She feels that at this stage of teleconferencing, charges for programs would be an additional barrier for those innovative teachers

who are making an effort to use the medium. If she had funds to cover the costs, Hubbard estimates she could offer a short program each day

Ideally, the Wilds would like to have a "library" of programs that had been developed in cooperation with teachers. The teachers would specify the learning objectives and relate these to the Ohio proficiency standards, and the Wilds would provide its content expertise and resources. The programs would be classified by grade level and proficiencies to facilitate the most appropriate response to teacher requests.

Hubbard has discussed with SchoolNet staff some of needs of the Wilds with regard to equipment and resources for content development and she expects to prepare proposals for funding. She has also written proposals for grants from other sources.

Like other content providers, Hubbard emphasized the Wilds' commitment to serving Telecommunities. Teleconferencing is an excellent outreach and fits well with the seasonal nature of programming at the Wilds. The peak demand for teleconferencing is during the school year when the number of actual visits to the Wilds is lower than during the summer months. According to Hubbard, "We are here [involved in teleconferencing] for the long-term."

Impact Statements: A Summary of Thoughts From the Field

The ten impact statements below represent a summary of perspectives from Telecommunity participants statewide. It should be noted that, in the minds of many Telecommunity participants, cost-effectiveness and impact are tightly intertwined. The measurements of impact listed below share a lot in common, therefore, with the measures of cost-effectiveness/value added listed elsewhere.

1. Traditionally, impact might be defined as increased student performance on measurable outcomes such as standardized tests. There was a noticeable lack of reference to this as a measure of impact of telecommunications technology on the part of most of those interviewed. In several cases it was highlighted as NOT an appropriate measure of impact. Several other participants suggested that eventually, student achievement scores would improve after exposure over time to telecommunications technologies. This would be especially true if content providers keyed their instruction to competency standards. In one Telecommunity project, leaders are almost certain that student test scores have improved but they recognize that they cannot claim cause and effect in this regard. This same Telecommunity

is asking for help in the form of evaluation expertise to come up with direct measurements of impact.

2. Impact can be defined by improvement in observable student behaviors:

   - Attendance
   - Excitement, interest, joy of learning
   - Engaged problem solving
   - Accepting responsibility for their own learning
   - Depth and extent of conversations, both with teachers and with other students
   - Style of presentations
   - Self-esteem, dress, and grooming

   These measures have been observed by several sites. As a by-product of being seen on TV by others, students are dressing better and acting better to show off their school in a good light. Some participants suggest that anecdotal responses from students are the best evidence of this impact statement. As a participant put it, we know we are having an impact if we bring the "WOW!" into the classroom.

3. A project is having an impact if more people (teachers, students, community organizations, and parents) are becoming involved over time. Measures of this might include increased attendance of teachers at inservice activities related to telecommunications; more partners within the Telecommunity becoming active; increased numbers of students becoming interested in subjects they had minimal, if any, interest in in the past; and PTAs becoming interested in meeting with other PTAs over the system. Also included in this impact measure would be an increase in the number of adult education programs engaged with the system—such as voluntary fire fighters, EMT, community policing training, and parenting skills—and increased awareness on the part of parents and other community members about what is happening in the school.

4. A project is having an impact if students are understanding and experiencing the basic functions of communications technology. It is generally recognized that preparing students for living in a technological world has become a major responsibility of schooling. Participants feel that allowing students to experience telecommunications technologies in as many ways as possible will have a definite impact on their futures. It is a recognition of the real-world skills required in business and other professions.

5. A project is having an impact if it is promoting multicultural experiences. This measure of impact came up many times and seems to be one of the unexpected benefits of telecommunications technologies. Students from diverse backgrounds can be brought together, encouraging them to communicate with and be tolerant of people they would not ordinarily encounter. In addition, virtual field trips and international experiences can be planned that take students far beyond their classrooms and allow them to interact with others very different from themselves.

6. A system is having an impact if it is addressing equity issues. Examples of this include rural children engaged in learning experiences that are not possible within their districts; remedial reading students gaining confidence and self-esteem because they are "privileged" to use the IDL room and interact with students in another school; and hospital- and home-bound kids being able to participate in classes with their healthy peers.

7. A system is having an impact if the number, variety, and quality of uses of the technology continually increases, and resources and experiences that would otherwise not be available are being provided. Measures of this include the quality (credibility) of content providers selected, greater diversity of courses offered, and an increased number of transmission hours that can be documented.

8. A system is having an impact if it encourages new teaching and learning roles. While this dimension of impact hasn't been fully explored by participants, it could be one of the more exciting and promising results of incorporating video technologies. Several projects have already noticed that students are taking greater responsibility for their own learning. One project notes a change in the way foreign languages are being taught: moving from drill and practice to online communications.

9. A system is having an impact if it is changing the amount and nature of professional development. Examples of this include using the system to provide graduate courses for teachers, allowing preservice teachers the opportunity to practice teaching over the system, and getting college professors involved in using the system for education classes.

10. A system is having an impact if it is promoting collaboration both within

and outside of the consortium. Measures of this would include the formation of new teaching partnerships, collaborative curriculum development, and student-initiated collaborations such as a videoconference on peer mediation.

Summary

To those who are looking for a rise in standardized test scores as the only or the most important measurement of impact, the ten statements above will be disappointing and may appear to be "soft" and inconsequential. Evaluation data suggest, however, that such reactions are unrealistic, if not destructive. There is an underlying energy and optimism in the measures of impact suggested by those most active in the implementation of Ohio Telecommunity projects. Those teachers and administrators who have described impact as they are witnessing it in their own settings have done so with seriousness, sincerity, and enthusiasm. Over time and with increased frequency, the ten descriptors of impact that emerged in this evaluation can have a cumulative significant effect on schooling in Ohio.

Recommendation: We suggest that the ten impact statements above be published and promoted as guidelines for the estimation of impact in the Telecommunities. Although no one project should be expected to show improvement on all measures, each would be expected to exhibit growth in four or five areas during evaluations in the coming years. As projects mature, more observations of impact may be added to this list and contribute to a grounded database of determinants of success in Ohio Telecommunities.

Need for Resources and Availability

A major theme that emerged from our site visits is the need for information and resources regarding what is happening in Telecommunities throughout the state. This is a product of the interest in collaboration and should be taken as a good sign. People are no longer focused on the technology. They are ready and eager to begin to collaborate beyond their own consortia and impatient for the information they need in order to do so.

The nine points mentioned below could be part of a large Web page devoted to Telecommunity resources. Constructing and maintaining this Web site would require a significant amount of effort and most certainly additional personnel at the Telecommunity office, as well as the cooperation of the Telecommunity grant sites, to provide data on an ongoing basis. Our observations suggest that the effort would contribute signifi-

cantly to project development and meaningful interactions across the state. So many sites asked for these resources, some for the second year in a row, that it is important to recognize them as genuine needs. (Note that many of the suggestions below were included in less detail in the recommendations of the Year Two Evaluation Report.)

I. Needed resources include the following:

1. A Web site of content providers. This site would provide several very important pieces of information: (a) names of contact people at the organization and information about how to reach them; (b) a description of the types of activities each organization can provide; (c) objectives coded to Ohio competencies in each content area (Note: Content providers may need help from the state to come up with some objectives, such as content coded to test items); and (d) List of sites already connected to the content provider who may, in turn, be interested in having its students interact with other sites working on the same objectives.

2. A Telecommunity Directory listing what network of schools or communities are funded, what equipment the consortia members are using, and what types of projects they are engaged in, as well as contact people at schools who would be willing to share advice and experience. Such a directory could be made available on a Web site and in hard copy, but should be well publicized so people know where they can find it.

3. Chatrooms geared to each discipline and cross-disciplinary chatrooms for Telecommunity participants. Teachers connecting with teachers would be the theme of this chatroom.

4. A resource person at the Telecommunity office level who can be called upon to provide answers to some of these resource needs. This person could be online to interact with participants as questions occur.

5. Technical help at the state level, particularly to solve problems with the SOMAC bridge. System failures are causing major problems when consortia try to reach sites outside the local networks. Interactive technical help could be available on the Web site.

6. A professional development clearinghouse. This Web site would provide ideas for attracting teachers to the system, training them to use it, and keeping them involved in distance learning. It would include ideas for compensat-

ing teachers, e.g,. release time, payment, and/or credit. The site would also provide examples of courses being offered to teachers and information about how they might sign up.

7. Help with assessing measurable outcomes from distance learning experiences. Although this might have to be on a project-by-project basis, the need is there across all sites. This evaluative component would also help address some of the cost-effectiveness questions and issues.

8. Projects looking for partners. This resource would provide a list of project ideas that could be added to by the membership on an ongoing basis. This interactive page of the Web site would provide names and contact information of teachers who wish to engage others in cross-consortia distance learning activities, and a brief description of these teachers' ideas.

9. A database of sites worldwide. Some participants, looking beyond the state of Ohio, would like a huge network for signing on for teleconferences anywhere in the world.

II. Example of a Telecommunity

Directory: Obviously such a database would take some time to develop and require the help of participating Telecommunities. A suggestion would be to develop the format (primitive structure in Table 6 below) and ask project leaders to fill in the blanks. There might be a way to describe exemplary projects in more detail in some other part of the database that could be referenced by those interested in that project but would not have to be read by all.

TABLE 6
TELECOMMUNITY DIRECTORY EXAMPLE

Site	Contact	Equipment	Exemplary Projects
NOTA Cleveland area	John Ramicone phone#, e-mail, address	Digital IDL System	Online Courses: Astronomy German, etc. Graduate courses: WVIZ projects
HEAL Cleveland	Frank DeTardo	V-Tel	Pyramid with Art Museum
New Millenneum Kids	Marshall Holmes	V-Tel	IDL teacher training Smithsonian Partners
LEARN	Pat Adkins Bart Anderson	V-Tel	Flex course
International Space Station	Jim Meinke	V-Tel	Shuttle Missions
Summit	Bob Meyers	Desktop w/H.323	English project

III. Example of Projects Looking for Partners: This format could be much like the above database, substituting the teachers as contacts and project ideas for exemplary projects. One person suggested that the Telecommunity hire a resource person whose sole job would be to make these connections. Here are some examples of projects suggested during my site visits that could be part of this database:

- One teacher in Stark County would like her students to be able to access researchers at participating universities.
- A speech teacher in Stark County would like to have mock debates with other schools in preparation for the actual debates her students are involved in on a yearly basis.
- Another teacher in Stark County would like to do interdisciplinary

work in American Studies, connecting students perhaps to the Smithsonian and to veterans of foreign wars.

- Another teacher wants to connect with NASA and the Kennedy Space Center for research on plants and astronaut food supplies.
- Summit and LEARN are both looking for partners in Technology Work Experience applications.
- One teacher in the HEAL Telecommunity has in mind a maritime project that would link students who live near water around the United States and the world. Students would compare and contrast their environments, and study various aspects of living in maritime communities.
- LEARN would like to see the Stone Lab equipped to come online.
- A German teacher in NOTA would like to connect her students with a school in Germany and perhaps with German politicians.

Summary

One of the clearest messages evaluators received from our visits to the Telecommunities is the need for a Web site that provides them with information and connectivity. It is a sign of progress that projects are recognizing the importance of communicating with their newly acquired technologies, both within and across consortia. Needs for information and connectivity have been expressed very concretely and repeatedly across sites.

Recommendation: We suggest that a Telecommunity staff member be hired or an existing staff member be assigned to develop the Web site described above. This should be done in a timely manner so as not to lose the momentum that is evidenced in many of the implementation projects.

Some Thoughts About Value-Added Contributions of the Technology From the Field

Introduction

We can theorize about and even try to legislate cost-effectiveness in the Telecommunity projects, but when all is said and done the issue is highly idiosyncratic and pragmatic. Cost-effectiveness means different things to different people under different circumstances. In this case, we tend to analyze cost-effectiveness and benefits under the lens of the technology's value-added contributions to the teaching and learning process. So how would participants in the Ohio Telecommunity like (or not like) to be judged regarding cost benefits? Following is a summary of their comments during focus group interviews:

1. **Two-way video telecommunications is not cost-effective in the traditional sense, especially in the beginning.**

There was general agreement that this is an expensive technology and that any formula focusing on expenditures vs. returns (assuming such a formula could be applied) would result in low cost-effectiveness scores. In addition, they generally agreed that such a formula is NOT appropriate for determining cost-effectiveness in the Telecommunities, at least at this time. A formula approach might look better when the costs of technology come down and system use increases, but both of these things will take time. "If we have the profit motive with all of this, we will never get anywhere," suggested one participant.

2. **A system is cost-effective if it gives students, teachers, and community members opportunities to take courses and engage in experiences impossible without distance learning technology.**

This is the most common measure of cost-effectiveness mentioned by participants, and it is the reason most became involved with distance technology in the first place. Numerous examples are evident throughout the Telecommunities of courses and workshops being offered (both for students and for teachers) and virtual field experiences being provided that were not available before the technology was in place. It is perhaps the most basic measure of cost-effectiveness, a measure that seems to be reevaluated over time to include a quality component. Some Telecommunities that have been in operation for more than a year insist that it is not just a matter of the number of opportunities provided, but of the quality and value of these opportunities.

3. **A system is cost-effective if it allows participants to explore and to become pioneers.**

Many participants suggest that the real benefit of telecommunications is the pioneering, exploratory opportunities it allows: "We may never prove it saves money but if it keeps us on the cutting edge of what can be done with technology, we will be happy." There is the feeling that educators need to be constantly challenging, stretching, and exploring new things. This approach insists that projects be judged on their innovation: on the number and quality of new activities they have generated. "When we become fearful of learning and growing [because we may not be cost effective], how can we expect our students to grow?" asked one participant. Another participant likened this to the space program: "If NASA worried about cost-effectiveness we would never be up in space."

4. **A system is cost-effective to the extent that students are actively engaged in learning and enjoying what they are doing.**

Increased student proficiency, "measured in both quality and quantity," defines this measure of cost-effectiveness. Many participants report that excitement, self-initiation, and joy of learning can be observed, if not measured, in students as a result of their participation in Telecommunity projects. For instance, project directors at the International Space Station Telecommunity report that, "teachers have already noticed extraordinary excitement, interest, and engaged problem solving on the part of students participating in the space missions." Observable characteristics might include improvement in the style of student presentations and in their communication skills, and the extent to which students begin to take responsibility for their own learning. This approach suggests that anecdotal stories, gathered from students and from teachers, coupled with systematic observation, would yield judgments of cost-effectiveness more than any formulas that could be applied.

5. **A system is cost-effective if there is a noticeable (measurable?) increase in the number and kinds of activities offered and in the number of students and teachers participating.**

This characteristic of cost-effectiveness demands steady growth over time. It would include counting total hours of use of the system, total number of students participating, total number of teachers and other educational personnel involved, and number and variety of applications for which the system is used. If a project is cost-effective, it is reasonable to assume that the numbers in each of these categories will increase from one year to the next until system saturation is reached.

6. **A system is cost-effective if it promotes understanding, collaboration, and tolerance among students of diverse backgrounds.**

This nontraditional measure of cost-effectiveness springs from observed "side-effects" of telecommunications applications. The cultural mix of students brought together through the technology promotes interactions that would be unlikely without telecommunications. One project participant put it this way: "There are a lot of by-products of this technology that are immeasurable. One of the big ones is the experience of students meeting students from other schools that are culturally or economically different." This outcome has been observed time and time again in the NOTA Telecommunity, and its value is considered to be way beyond their highest expectations. It has also been observed in other projects that bring people of diverse backgrounds together.

7. **A system is cost-effective if student performance improves.**

While this characteristic is viewed with caution by most participants, some suggest that measurable performance based on the content of the lesson, increased attendance, and improved writing skills would be marks of a cost-effective system. At least two projects are trying to collect data comparing student performance in traditional and distance learning courses. Research shows this type of comparison should be done only with extreme caution, as there are too many variables at work to make causal statements. Comparison is not an essential component of this measure, however. Improved performance based on pre- and postcourse measures is acceptable as evidence of system impact. Note that not one Telecommunity suggested that improved scores on standardized competency tests should be a measure of cost effectiveness, though at least one district, Columbus, is working with an outside consultant to ensure that all activities and materials used in the district are aligned with proficiency standards.

8. **A system is cost-effective if good teachers can be shared and some teachers are freed up to do other things needed in the district.**

In some Telecommunities there is a shortage of qualified teachers for certain subjects that distance learning helps to fill. In other instances, teachers whose classes are now taught from remote sites are free to work with students who are having problems, e.g., trouble with testing. One participant suggested that the cost-effectiveness in this regard might not be immediately evident: "If an innovation yields more effective teaching, it can impact a whole generation of students. To determine if an innovation has such long-range potential, it is necessary to take some risks that in the short run will not be cost-effective."

9. **A system is cost-effective insofar as the content delivered is recyclable.**

This characteristic does not necessarily imply that all Telecommunity efforts should be "canned" so they can be used over and over again, but it does suggest that at least those activities and/or courses that have required large amounts of time and energy to develop, and those that have been shown to be successful, can and should be repeated as appropriate. This is especially relevant for content providers, who are called upon to repeat performances many times over. Experience will suggest how to recycle good content without losing the spontaneity so important to engaged interactivity.

10. **A system is cost-effective if it promotes better knowledge of and facility with technology.**

For some Telecommunities, technology is an end in itself as educators try to prepare students for life in the 21st century. Giving students high tech experiences and encouraging them to learn the technical aspects of these systems as well as their potential for educational applications, should be one of the most important goals of using telecommunications in schools. The argument is that this exposure prepares students in numerous ways for college and/or the world of work.

11. **A system is cost-effective if it helps "sell the school" to parents of perspective students.**

While this is a feature rarely mentioned in public education, it is an important aspect of private and parochial schools. Educators in the Catholic Conference emphasized that the technology is a recruitment tool for their schools.

12. **A system is cost-effective if it is used to conserve resources in the daily operation of agencies.**

This criterion suggests that the time and expense of driving teachers and administrators from remote areas to meetings across the state could easily be absorbed by teleconferencing, and "questions about cost-effectiveness would fade away."

Summary

We have presented 12 measures of cost-effectiveness identified by Ohio Telecommunity participants. We suggest these statements may form a set of criteria by which Telecommunities could be assessed in the future. While no one Telecommunity should be expected to provide positive evidence on all 12 measures, perhaps it is reasonable to expect each should show activity on at least four or more if they are making acceptable progress. At the very least, they might provide a set of guidelines to which Telecommunities could direct their efforts.

TELECOMMUNITY PRACTICE ILLUSTRATED

As Telecommunities organize themselves and put the technology to use in the schools, some exceptional examples of interactive distance learning have emerged. Presented here in summary form of a paragraph or two each, are several anecdotes of how Telecommunities are working to collaborate on, invent, and produce new and improved learning opportunities for students and teachers. These stories by no means represent the totality of what is innovative or productive among the combined Telecommunity consortia, but they do illustrated the range of effects of how previously unattainable learning resources are accessed and used and how interest for learning improves among students and teachers.

A New Era of Teacher Collaboration in the Vital Links Consortia

"Rare," is how Tom Stone, assistant superintendent at Cardinal Local Schools, describes any type of collaboration between teachers, especially when they are not working in the same building. That goes for teachers even in the same district. So when six teachers from each of the three high schools from the Vital Links Consortia assembled for a total of three working days—spaced several weeks apart to talk about curriculum issues in using video technologies—a new era of teacher collaboration began. Prior to the interschool collaboration, no documented correspondence between teachers on curriculum issues had taken place for several years, if not longer. The experience was so positive that each of the schools within the district is committed to coordinating preparation periods and inservice days so that teachers in each of the three schools participating in the interactive video Telecommunity partnership can extend their collaborative activities. Cardinal Local Schools, in the northeastern part of the state, are so impressed with the results of their experience with their Telecommunity partners, says Stone, that they will reach out to neighboring schools districts to increase the collaborative connections for the districts' teachers and students.

Two Years of Interactive Video Use in New Lexington Public Schools

New Lexington has applied interactive video distance learning in the district for two years. Learning activities have been organized to bring the expertise of state historians, archeologists, geologists, and animal scientists into the classroom through the video systems. Students in New Lexington schools have worked with students from schools in distant parts of the state to make learning a shared experience. Teachers in New Lexington agree that anyone will be hard-pressed to identify learning outcomes that are readily evident on a standardized measure. But teachers have observed that experiences in interactive video-supported instruction have made students more motivated learners by making them better searchers and presenters of information. On a discussion centering on Bloom's Taxonomy of Learning, one teacher says, "It brings students to a higher level of thinking because they are learning skills that they need to know to find information." Additionally, teachers unanimously agree that using the video technology actually makes it easier to meet state and content curriculum objectives.

Peace Officer Training

Acting under the direction of Attorney General Betty Montgomery, law enforcement training officer Janet Wood-Jones sent a brief survey to several Telecommunity project directors inquiring about their interest in hosting peace officer trainings. Working from a list of over 200 sites in the state with SOMAC access and T-1 line connectivity, the Peace Officer Training Commission narrowed their focus to schools and community colleges to help bring low-cost, high-quality inservice training to their officers.

The use of interactive video to bring training to Ohio's peace officers is a new venture for the Training Commission, but it is one that that Wood-Jones describes as high on Montgomery's list. Currently, a large number of Ohio peace officers are unable to attend advanced training due to budget, time, or family needs. Interactive video allows the Training Commission, as Wood-Jones states, "to accommodate the officer in his life and in his context." Previous officer training has often been prohibitive because of the high cost of inservice training for peace officers, which involved centrally locating the officers and paying costs of travel and time. But interactive video connectivity and cost reductions associated with quality training present the opportunity for putting an inservice requirement in place much like the 40-hour annual inservice requirement Kentucky has for its peace officers, in addition to the yearly firearm requalification officers already undergo.

To date, the Training Commission has used external sites to deliver three training sessions using interactive video systems: Use of Force Liability, Developing a Winning Attitude, and Firearms Instructor Requalification. But because these agencies have restricted time schedules for the use of the technology (Department of Health and Human Services) or have very restricted participant seating capacity (Department of Rehabilitation and Corrections), the search continues for more flexible partners in the delivery of this training. The Training Commission is looking for partners that would provide seating at easily accessible sites to accommodate some 15 to possibly 90 officers at a time. Wood-Jones, who is pursuing the connections to Telecommunity consortia, agrees that public schools are valuable because of the "officer presence" the training in the school gives, and also because it shows students that peace officers are continually upgrading their skills and training to deal directly and sensitively with law enforcement issues. These schools are valuable to the Training Commission, Wood-Jones adds, because of the growing presence Telecommunities have in the state and their willingness to serve the community.

Business and Corporate Partnerships in Teacher Development

The strength of the Chillicothe project—according to participants—is the involvement of local businesses and industry in teacher development experiences. With the help of these partners, the project has developed teacher externships that connect teachers with people in business and industry who share what math, science, and communication skills are necessary to compete in the local job market. Through this program, science teachers share information and ideas with environmental education instructors from Ohio University. Language teachers have gone back with information to share with their students on how important communication skills are to such career areas as law enforcement, journalism, and social work. These externships have been done without teachers ever leaving the school building as live video connections facilitate the activity between teachers and industry contacts.

Besides being in contact with professionals in the community, teachers are also connected via interactive video contact with their peers throughout the Pickaway and Ross County areas. In these staff development sessions, teachers have been able to collaborate to support weak strands of instruction identified through collective analysis of student proficiency data at grades 4, 6, and 8. Topics of live-video-supported workshops include review of the reform models offered through Porter-Obey legislation and how these models can be adopted to school continuous improvement plans; curriculum mapping strategies and software that is available for curriculum alignment; and integration of career cluster instruction into existing lesson plans.

Collaborative Student Television Programming Production

In the Allen County Consortia students from schools in three middle school and six high schools develop video segments to run on the local public television cable channel. With interactive video bridging across six high schools and three middle schools in the area, students now collaborate on stories (e.g., student government, drug use, school violence) that are relevant to the several communities and schools that serve them rather than stories pertinent only to the individual schools involved in them. By writing, scripting, producing, and presenting stories to a real audience, teachers and students both say they are motivated to produce a quality product and that the motivation itself intensifies the learning experience. Teachers also report that students frequently work on their own time to prepare broadcast stories and develop quality leadership skills through production of the stories. Access to the interactive video equipment enables the transfer of

proven curriculum activities for technology learning from more advanced classrooms in schools long experienced in video production to classrooms in schools just having joined the consortia.

Taking Advantage of Local Opportunity in the NOTA Consortia

A group of speech/communications teachers in Stark County heard that Helen Thomas, Dean of the Washington Press Corps, was going to give a speech at Kent State University. The enterprising teachers, assuming that Thomas would be in the area for several hours before her speech, suggested to contacts at the University that her waiting time could be used effectively by connecting her through the video network with high school classes for an interview. Happily, Thomas did have the time and was willing to participate in a teleconference-interview. Three high school classes were online with Thomas. Junior and senior students asked prepared questions in rotation from site to site. After the teleconference students revealed their excitement at being a part of such a memorable occasion. Their teachers had prepared them for the event by showing the *A&E Biography* on Helen Thomas and having the students study more about her, so it was even more impressive to them to be able to question her "in person." One young man remarked, "Every day when I go home my mother asks me what happened in school today. I usually say, 'Nothing special.' Today, I can't wait to go home to tell her about this."

Also in the NOTA consortium, a graduate of one of the participating schools happens to be a very successful musician and a professor at Julliard School of Music. This person was brought live online for one and a half hours of questions and answers with students. This was a highly successful experience for all involved. Connections were made to New York through Bell Atlantic.

Taking Advantage of a Distant Opportunity in the New Millennium Consortia

One of the experiences offered by the Cleveland Zoo in the fall of 1998 is an excellent example of integration of material from a content provider across disciplines and grade levels. The zoo had a class about the reintroduction of the trumpeter swan in the United States and the Andean condor in Venezuela. Students from elementary schools in the two countries are pen pals, comparing the two projects and finding similarities and differences. One of the differences is in the migration patterns of the two birds. Students can go to the zoo's Web site and follow the migrations of birds that have been tagged with satellite transmitters. High school Spanish students translate the letters of the elementary students.

Three Illustrations of Imaginative Collaboration Even Before the Hardware Is in Place

The HEAL project didn't wait for all of their technical components to fall into place to develop an impressive collaborative effort across disciplines, grade levels, and institutions. Key players were the Cleveland Museum of Art, art students at John Jay High School, and second graders at Jamison Elementary School in Cleveland. Art students at the high school replicated artifacts, including pyramids, by studying originals at the museum and having input from museum content providers. The high school students then taught what they had learned to the second graders at Jamison. Curriculum integration included math (shapes), geography and history (Egypt), Science (Nile, river flooding, and so on) writing activities, and hieroglyphics. Frank DeTardo feels that this project is one of the reasons second graders in his school scored highest in the district on proficiency tests. He is eager to develop a lot more peer collaborative activities like it.

The International Space Station Telecommunity in Lakewood, Ohio, is a stellar example of a long-running collaborative effort that is now being greatly enhanced by video networking. This project differs from many others in that it is focused on space mission simulations that have been developed over the course of nine years. While the project has a single dedication of purpose, it has multiple disciplinary and curriculum-related connections. It promotes a cross-disciplinary approach to problem-based, action-centered learning. The technology incorporated into the simulated experiences has been acquired for a specific purpose—to use as tools to assist in accomplishing the goals of the space missions. Telecommunications help the sites communicate with each other as they accomplish their respective tasks. University School is a Shuttle and Mission Control. Collinwood is a Shuttle, and Lakewood is the space station and Space Station Mission Control. High schools in the consortium build the simulators for the participating middle schools.

A teacher in Summit County has made arrangements with Kent State University to connect high school English teachers and their students with English Education professors and their students at Kent State. The idea would be for English Education students at the university to read and give feedback to essays written by high school students, helping them to improve their writing. In turn, the high school students would be hooked up with elementary students in the district to help them improve their writing skills—students helping students, from graduate level to elementary.

Kids Behind the Wheel: Scaling Up Driver's Education in the Imaginet Telecommunity

When students in Ohio schools heard that new rules for licensing teenage drivers would become effective on January 1, 1999, their interest in completing the training before the new rules went into effect increased dramatically. Most schools were not equipped to handle the influx of students into the driver's education courses. Schools in the Imaginet Telecommunity, however, were ready. The Telecommunity employed its interactive video system to provide driving instruction from an originating site to several satellite sites throughout the region. By broadcasting the classroom component of this training, many more students received instruction during regular school hours, thus eliminating the need to hold classes on Saturday.

Innovative Professional Development Opportunities

The NOTA Telecommunity reports two creative uses of their IDL system for professional development: (1) Cleveland State University allowed their students in science methods courses to observe some of the innovative science teaching going on in the network schools; and (2) student teachers at Baldwin-Wallace University are spending time in the IDL room getting used to it. This second use serves two purposes: Students will be more comfortable teaching in this setting when they get out into the schools, and the professors who drop in to observe their teaching are beginning to see the value of the IDL network.

Two Illustrations of Innovative Course Delivery

There are a number of traditional and nontraditional courses being conducted in the various Telecommunities around the state. One that promises to have measurable comparative results is offered by WVIZ to students in the NOTA Telecommunity prior to their taking the SAT and ACT exams. Besides the academic outcomes that seem to be highly successful, bringing students together face to face after the course in the WVIZ studios is noted as being a highly gratifying experience for all involved.

The LEARN consortium is experimenting with a three-week course they call FLEX, in which students are exposed to several different languages to help them decide which they want to take in high school.

Innovative Student Use of the Network

NOTA reports that a group of students in one of their high schools initiated a videoconference on peer mediation, with students from other schools. The students all worked

well together, made strong friendships, and decided they wanted to do this again and again. Both in this student-initiated effort and in the teacher-led courses, NOTA stresses the community aspects of their IDL system. Having students interact both academically and socially across schools in the consortium seems to promote tolerance and understanding among students from different backgrounds. Having face-to-face meetings at some point during the IDL experience seems to strengthen bonds of commitment to each other's learning.

Summary

While none of these stories present statistics that unequivocally show that using technology improves student achievement on standardized measures, teachers within the system have stated that such achievement is being realized. Instances of improved student writing, better organization of ideas, more strategic thinking, enhanced communications and presentation skills, and the emergence of collaborative work projects all suggest that some powerful impacts are being achieved through the use of the technology.

Additionally, these stories show that the essential conditions for improvement-oriented technological application are addressed. Some of these conditions include the following:

1. The technology is enabling the education system to function more effectively by putting teachers in greater contact with each other to discuss issues related to curriculum development, delivery, and assessment.
2. Organizational changes such as block scheduling and the coordination of teacher preparation periods encourage more effective use of the technology and curriculum.
3. Teachers have access to professional development experiences that have previously been impossible to provide without costly outlay.
4. Students have had access to expert resources of knowledge and information that would be nonexistent without technology.
5. With video technology in place, more than schools are considering the nature and content of the school learning experience: museums, universities, businesses, and others assume new roles in the education of the Telecommunity consortia's students and teachers.
6. The connectivity of interactive video allows schools to raise awareness and expectations about what others are doing in terms of improving teaching and learning standards.

With one boundary of the technology system encompassing the schools and the other boundary of the system encompassing society (e.g., business, industry, Peace Officer Training Commission, and public and commercial broadcasting systems), the sustainability of the Telecommunity initiative improves, as does its affordability. The needs these Telecommunities have is to understand how they can better communicate and collaborate with each other to ensure that sustainability.

APPENDIX

The Ohio SchoolNet Telecommunity Participant Questionnaire

Instructions

Welcome all Ohio SchoolNet Telecommunity participants. The following survey is a part of the ongoing evaluation of the Telecommunity project that funds network/desktop video integration your school/consortia. This survey will take about 12 minutes to complete. You may be saying, 'I've hardly done anything with the project and have no experiences or opinions to report.' However, this survey isn't oriented at the things you've observed as a result of using the technology. It's oriented towards sensing the type of concerns you have about participating in the project no matter how much you've used the technology. Your answers to the questions below help determine what assistance the SchoolNet Telecommunity organization can provide to help your consortia better integrate network/desktop video technologies into the curriculum.

Please complete the entire questionnaire. The first few questions help us identify you and the consortia you are affiliated with. This helps us make sure that everyone has completed the questionnaire. Your answers will be kept strictly confidential and reported only in the aggregate. Thank-you for your input. If you have any questions please contact me. (Mark Hawkes)

---

1. Your name:

2. The consortia/project you are affiliated with:

3. Number of years you have been affiliated with the project:

   Just starting
   1 year
   2 years
   3 years

4. What's your role in the project?

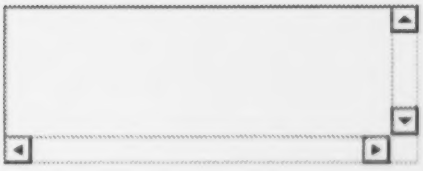
   Project-level adminisrator
   Site-level administrator(e.g.Principal or Vice-principal)
   Technology Coordinator
   Teacher on system
   Teacher who may use system in the future
   Other (please explain)

5. How comfortable would you say you are with educational technologies as a whole? (computers, multimedia, distance learning technologies, etc.)

   not at all comfortable, I rarely use them
   somewhat comfortable
   quite comfortable

very comnfortable, the use of them present no problem for me

6. Who in your school or project do you feel is using the network or desktop technology in a useful or exemplary way? Please provide more than one referral if you wish.



Please answer the remaining questions using the seven-point scale provided.

Scale:
------- 0 ------- 1 ------- 2 ------- 3 ------- 4 ------- 5 ------- 6 ------- 7 -------
Irrelevant || Not true of me now || Somewhat true of me now || Very true of me now

1. I am concerned about students' attitudes toward network video technology.
0 1 2 3 4 5 6 7

2. I now know of some other approaches that might work better.
0 1 2 3 4 5 6 7

3. I don't even know what network video technology is.
0 1 2 3 4 5 6 7

4. I am concerned about not having enough time to organize myself each day.
0 1 2 3 4 5 6 7

5. I would like to help other faculty in their use of the network video technology.
0 1 2 3 4 5 6 7

6. I have a very limited knowledge about network video technology.
0 1 2 3 4 5 6 7

7. I would like to know the effect of change and/or effect on my professional status the project brings.
0 1 2 3 4 5 6 7

8. I am concerned about conflict between my interests and my responsibilities.
0 1 2 3 4 5 6 7

9. I've used network video technology, now I'm concerned about improving my use of technology.
0 1 2 3 4 5 6 7

10. I would like to develop working relationships with both our faculty and outside faculty using network video technology.
0 1 2 3 4 5 6 7

11. I am concerned about how the network video technology affects students.
0 1 2 3 4 5 6 7

12. I am not concerned about this network video technology.
0 1 2 3 4 5 6 7

13. I would like to know who will make the decisions about the fit of the technology integrated curriculum into the schools curricular development system.
0 1 2 3 4 5 6 7

14. I would like to discuss the possibility of using the network video technology.
0 1 2 3 4 5 6 7

15. I would like to know what resources are available if we decide to adopt network video technology.
0 1 2 3 4 5 6 7

16. I am concerned about my inability to manage all that network video technology curricular development and delivery requires.
0 1 2 3 4 5 6 7

17. I would like to know how my teaching or classroom administration is supposed to change.
0 1 2 3 4 5 6 7

18. I would like to familiarize other departments or persons with the progress of network video technology use in the classroom.
0 1 2 3 4 5 6 7

19. I am concerned about evaluating my impact on students.
0 1 2 3 4 5 6 7

20. I would like to revise the network video technology's instructional approach.
0 1 2 3 4 5 6 7

21. I am completely occupied with other things.
0 1 2 3 4 5 6 7

22. I would like to modify our use of the network video technology based on the experiences of our students.
0 1 2 3 4 5 6 7

23. Although I don't know about this network video technology, I am concerned about things in the area.

0 1 2 3 4 5 6 7

24. I would like to excite my students about their part in this approach.
0 1 2 3 4 5 6 7

25. I am concerned about time spent working with nonacademic problems related to network video

technology.
0 1 2 3 4 5 6 7

26. I would like to know what the use of network video technology will require in the immediate future.
0 1 2 3 4 5 6 7

27. I would like to coordinate my effort with others to maximize the network video technology's effects.
0 1 2 3 4 5 6 7

28. I would like to have more information on time and energy commitments required by this network video technology.
0 1 2 3 4 5 6 7

29. I would like to know what other faculty are doing in this area.
0 1 2 3 4 5 6 7

30. At this time, I am not interested in learning about this network video technology.
0 1 2 3 4 5 6 7

31. I would like to determine how to supplement, enhance, or replace the network video technology.
0 1 2 3 4 5 6 7

32. I would like to use feedback from students to change the way we use network video technology.
0 1 2 3 4 5 6 7

33. I would like to know how my role will change when I am using the network video technology.
0 1 2 3 4 5 6 7

34. Coordination of tasks and people is taking too much of my time.
0 1 2 3 4 5 6 7

35. I would like to know how this network video technology is better than what we have now.
0 1 2 3 4 5 6 7

Do you have any other comments you'd like to make about you current or future participation in the network video development project?

submit

Reset form